SEQUENCE LISTING

<110> Makielski, Jonathan C
      Ye, Bin

<120> Sodium Channel Alpha Subunits

<130> 960296.98032

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<160> 10

<170> PatentIn Ver. 2.1

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<211> 6091
<212> DNA
<213> Homo sapiens

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agg ttc aca cgg gag tcc ctg gca gcc atc gag aag cgc atg gcg gag   99
Arg Phe Thr Arg Glu Ser Leu Ala Ala Ile Glu Lys Arg Met Ala Glu
15   20   25   30

aag caa gcc cgc ggc tca acc acc ttg cag gag agc cga gag ggg ctg   147
Lys Gln Ala Arg Gly Ser Thr Thr Leu Gln Glu Ser Arg Glu Gly Leu
                35   40   45

ccc gag gag gag gct ccc cgg ccc cag ctg gac ctg cag gcc tcc aaa   195
Pro Glu Glu Glu Ala Pro Arg Pro Gln Leu Asp Leu Gln Ala Ser Lys
                50   55   60

aag ctg cca gat ctc tat ggc aat cca ccc caa gag ctc atc gga gag   243
Lys Leu Pro Asp Leu Tyr Gly Asn Pro Pro Gln Glu Leu Ile Gly Glu
            65   70   75

ccc ctg gag gac ctg gac ccc ttc tat agc acc caa aag act ttc atc   291
Pro Leu Glu Asp Leu Asp Pro Phe Tyr Ser Thr Gln Lys Thr Phe Ile
        80   85   90

gta ctg aat aaa ggc aag acc atc ttc cgg ttc agt gcc acc aac gcc   339
Val Leu Asn Lys Gly Lys Thr Ile Phe Arg Phe Ser Ala Thr Asn Ala
95   100   105   110

ttg tat gtc ctc agt ccc ttc cac ccc atc cgg aga gcg gct gtg aag   387
Leu Tyr Val Leu Ser Pro Phe His Pro Ile Arg Arg Ala Ala Val Lys
                115   120   125

-1-

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att ctg gtt cac tcg ctc ttc aac atg ctc atc atg tgc acc atc ctc    435
Ile Leu Val His Ser Leu Phe Asn Met Leu Ile Met Cys Thr Ile Leu
            130                 135                 140

acc aac tgc gtg ttc atg gcc cag cac gac cct cca ccc tgg acc aag    483
Thr Asn Cys Val Phe Met Ala Gln His Asp Pro Pro Pro Trp Thr Lys
            145                 150                 155

tat gtc gag tac acc ttc acc gcc att tac acc ttt gag tct ctg gtc    531
Tyr Val Glu Tyr Thr Phe Thr Ala Ile Tyr Thr Phe Glu Ser Leu Val
    160                 165                 170

aag att ctg gct cga ggc ttc tgc ctg cac gcg ttc act ttc ctt cgg    579
Lys Ile Leu Ala Arg Gly Phe Cys Leu His Ala Phe Thr Phe Leu Arg
175                 180                 185                 190

gac cca tgg aac tgg ctg gac ttt agt gtg att atc atg gca tac aca    627
Asp Pro Trp Asn Trp Leu Asp Phe Ser Val Ile Ile Met Ala Tyr Thr
                195                 200                 205

act gaa ttt gtg gac ctg ggc aat gtc tca gcc tta cgc acc ttc cga    675
Thr Glu Phe Val Asp Leu Gly Asn Val Ser Ala Leu Arg Thr Phe Arg
            210                 215                 220

gtc ctc cgg gcc ctg aaa act ata tca gtc att tca ggg ctg aag acc    723
Val Leu Arg Ala Leu Lys Thr Ile Ser Val Ile Ser Gly Leu Lys Thr
            225                 230                 235

atc gtg ggg gcc ctg atc cag tct gtg aag aag ctg gct gat gtg atg    771
Ile Val Gly Ala Leu Ile Gln Ser Val Lys Lys Leu Ala Asp Val Met
    240                 245                 250

gtc ctc aca gtc ttc tgc ctc agc gtc ttt gcc ctc atc ggc ctg cag    819
Val Leu Thr Val Phe Cys Leu Ser Val Phe Ala Leu Ile Gly Leu Gln
255                 260                 265                 270

ctc ttc atg ggc aac cta agg cac aag tgc gtg cgc aac ttc aca gcg    867
Leu Phe Met Gly Asn Leu Arg His Lys Cys Val Arg Asn Phe Thr Ala
                275                 280                 285

ctc aac ggc acc aac ggc tcc gtg gag gcc gac ggc ttg gtc tgg gaa    915
Leu Asn Gly Thr Asn Gly Ser Val Glu Ala Asp Gly Leu Val Trp Glu
            290                 295                 300

tcc ctg gac ctt tac ctc agt gat cca gaa aat tac ctg ctc aag aac    963
Ser Leu Asp Leu Tyr Leu Ser Asp Pro Glu Asn Tyr Leu Leu Lys Asn
            305                 310                 315

ggc acc tct gat gtg tta ctg tgt ggg aac agc tct gac gct ggg aca   1011
Gly Thr Ser Asp Val Leu Leu Cys Gly Asn Ser Ser Asp Ala Gly Thr
    320                 325                 330

tgt ccg gag ggc tac cgg tgc cta aag gca ggc gag aac ccc gac cac   1059
Cys Pro Glu Gly Tyr Arg Cys Leu Lys Ala Gly Glu Asn Pro Asp His
335                 340                 345                 350

ggc tac acc agc ttc gat tcc ttt gcc tgg gcc ttt ctt gca ctc ttc   1107
Gly Tyr Thr Ser Phe Asp Ser Phe Ala Trp Ala Phe Leu Ala Leu Phe
                355                 360                 365
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-2-

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cgc ctg atg acg cag gac tgc tgg gag cgc ctc tat cag cag acc ctc    1155
Arg Leu Met Thr Gln Asp Cys Trp Glu Arg Leu Tyr Gln Gln Thr Leu
            370             375             380

agg tcc gca ggg aag atc tac atg atc ttc ttc atg ctt gtc atc ttc    1203
Arg Ser Ala Gly Lys Ile Tyr Met Ile Phe Phe Met Leu Val Ile Phe
            385             390             395

ctg ggg tcc ttc tac ctg gtg aac ctg atc ctg gcc gtg gtc gca atg    1251
Leu Gly Ser Phe Tyr Leu Val Asn Leu Ile Leu Ala Val Val Ala Met
            400             405             410

gcc tat gag gag caa aac caa gcc acc atc gct gag acc gag gag aag    1299
Ala Tyr Glu Glu Gln Asn Gln Ala Thr Ile Ala Glu Thr Glu Glu Lys
415             420             425             430

gaa aag cgc ttc cag gag gcc atg gaa atg ctc aag aaa gaa cac gag    1347
Glu Lys Arg Phe Gln Glu Ala Met Glu Met Leu Lys Lys Glu His Glu
            435             440             445

gcc ctc acc atc agg ggt gtg gat acc gtg tcc cgt agc tcc ttg gag    1395
Ala Leu Thr Ile Arg Gly Val Asp Thr Val Ser Arg Ser Ser Leu Glu
            450             455             460

atg tcc cct ttg gcc cca gta aac agc cat gag aga aga agc aag agg    1443
Met Ser Pro Leu Ala Pro Val Asn Ser His Glu Arg Arg Ser Lys Arg
            465             470             475

aga aaa cgg atg tct tca gga act gag gag tgt ggg gag gac agg ctc    1491
Arg Lys Arg Met Ser Ser Gly Thr Glu Glu Cys Gly Glu Asp Arg Leu
            480             485             490

ccc aag tct gac tca gaa gat ggt ccc aga gca atg aat cat ctc agc    1539
Pro Lys Ser Asp Ser Glu Asp Gly Pro Arg Ala Met Asn His Leu Ser
495             500             505             510

ctc acc cgt ggc ctc agc agg act tct atg aag cca cgt tcc agc cgc    1587
Leu Thr Arg Gly Leu Ser Arg Thr Ser Met Lys Pro Arg Ser Ser Arg
            515             520             525

ggg agc att ttc acc ttt cgc agg cga gac ctg ggt tct gaa gca gat    1635
Gly Ser Ile Phe Thr Phe Arg Arg Arg Asp Leu Gly Ser Glu Ala Asp
            530             535             540

ttt gca gat gat gaa aac agc aca gcg ggg gag agc gag agc cac cgc    1683
Phe Ala Asp Asp Glu Asn Ser Thr Ala Gly Glu Ser Glu Ser His Arg
            545             550             555

aca tca ctg ctg gtg ccc tgg ccc ctg cgc cgg acc agt gcc cag gga    1731
Thr Ser Leu Leu Val Pro Trp Pro Leu Arg Arg Thr Ser Ala Gln Gly
            560             565             570

cag ccc agt ccc gga acc tcg gct cct ggc cac gcc ctc cat ggc aaa    1779
Gln Pro Ser Pro Gly Thr Ser Ala Pro Gly His Ala Leu His Gly Lys
575             580             585             590

aag aac agc act gtg gac tgc aat ggg gtg gtc tca tta ctg ggg gca    1827
Lys Asn Ser Thr Val Asp Cys Asn Gly Val Val Ser Leu Leu Gly Ala
            595             600             605
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-3-

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ggc gac cca gag gcc aca tcc cca gga agc cac atc ctc cgc cct gtg        1875
Gly Asp Pro Glu Ala Thr Ser Pro Gly Ser His Ile Leu Arg Pro Val
            610             615             620

atg cta gag cac ccg cca gac acg acc acg cca tcg gag gag cca ggc        1923
Met Leu Glu His Pro Pro Asp Thr Thr Thr Pro Ser Glu Glu Pro Gly
            625             630             635

ggg ccc cag atg ctg acc tcc cag gct ccg tgt gta gat ggc ttc gag        1971
Gly Pro Gln Met Leu Thr Ser Gln Ala Pro Cys Val Asp Gly Phe Glu
            640             645             650

gag cca gga gca cgg cag cgg gcc ctc agc gca gtc agc gtc ctc acc        2019
Glu Pro Gly Ala Arg Gln Arg Ala Leu Ser Ala Val Ser Val Leu Thr
655             660             665             670

agc gca ctg gaa gag tta gag gag tct cgc cac aag tgt cca cca tgc        2067
Ser Ala Leu Glu Glu Leu Glu Glu Ser Arg His Lys Cys Pro Pro Cys
            675             680             685

tgg aac cgt ctc gcc cag cgc tac ctg atc tgg gag tgc tgc ccg ctg        2115
Trp Asn Arg Leu Ala Gln Arg Tyr Leu Ile Trp Glu Cys Cys Pro Leu
            690             695             700

tgg atg tcc atc aag cag gga gtg aag ttg gtg gtc atg gac ccg ttt        2163
Trp Met Ser Ile Lys Gln Gly Val Lys Leu Val Val Met Asp Pro Phe
            705             710             715

act gac ctc acc atc act atg tgc atc gta ctc aac aca ctc ttc atg        2211
Thr Asp Leu Thr Ile Thr Met Cys Ile Val Leu Asn Thr Leu Phe Met
            720             725             730

gcg ctg gag cac tac aac atg aca agt gaa ttc gag gag atg ctg cag        2259
Ala Leu Glu His Tyr Asn Met Thr Ser Glu Phe Glu Glu Met Leu Gln
735             740             745             750

gtc gga aac ctg gtc ttc aca ggg att ttc aca gca gag atg acc ttc        2307
Val Gly Asn Leu Val Phe Thr Gly Ile Phe Thr Ala Glu Met Thr Phe
            755             760             765

aag atc att gcc ctc gac ccc tac tac tac ttc caa cag ggc tgg aac        2355
Lys Ile Ile Ala Leu Asp Pro Tyr Tyr Tyr Phe Gln Gln Gly Trp Asn
            770             775             780

atc ttc gac agc atc atc gtc atc ctt agc ctc atg gag ctg ggc ctg        2403
Ile Phe Asp Ser Ile Ile Val Ile Leu Ser Leu Met Glu Leu Gly Leu
            785             790             795

tcc cgc atg agc aac ttg tcg gtg ctg cgc tcc ttc cgc ctg ctg cgg        2451
Ser Arg Met Ser Asn Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg
            800             805             810

gtc ttc aag ctg gcc aaa tca tgg ccc acc ctg aac aca ctc atc aag        2499
Val Phe Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Thr Leu Ile Lys
815             820             825             830

atc atc ggg aac tca gtg ggg gca ctg ggg aac ctg aca ctg gtg cta        2547
Ile Ile Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu
            835             840             845
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gcc atc atc gtg ttc atc ttt gct gtg gtg ggc atg cag ctc ttt ggc    2595
Ala Ile Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly
        850             855             860

aag aac tac tcg gag ctg agg gac agc gac tca ggc ctg ctg cct cgc    2643
Lys Asn Tyr Ser Glu Leu Arg Asp Ser Asp Ser Gly Leu Leu Pro Arg
        865             870             875

tgg cac atg atg gac ttc ttt cat gcc ttc ctc atc atc ttc cgc atc    2691
Trp His Met Met Asp Phe Phe His Ala Phe Leu Ile Ile Phe Arg Ile
        880             885             890

ctc tgt gga gag tgg atc gag acc atg tgg gac tgc atg gag gtg tcg    2739
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ser
895             900             905             910

ggg cag tca tta tgc ctg ctg gtc ttc ttg ctt gtt atg gtc att ggc    2787
Gly Gln Ser Leu Cys Leu Leu Val Phe Leu Leu Val Met Val Ile Gly
                915             920             925

aac ctt gtg gtc ctg aat ctc ttc ctg gcc ttg ctg ctc agc tcc ttc    2835
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
                930             935             940

agt gca gac aac ctc aca gcc cct gat gag gac aga gag atg aac aac    2883
Ser Ala Asp Asn Leu Thr Ala Pro Asp Glu Asp Arg Glu Met Asn Asn
            945             950             955

ctc cag ctg gcc ctg gcc cgc atc cag agg ggc ctg cgc ttt gtc aag    2931
Leu Gln Leu Ala Leu Ala Arg Ile Gln Arg Gly Leu Arg Phe Val Lys
        960             965             970

cgg acc acc tgg gat ttc tgc tgt ggt ctc ctg cgg cag cgg cct cag    2979
Arg Thr Thr Trp Asp Phe Cys Cys Gly Leu Leu Arg Gln Arg Pro Gln
975             980             985             990

aag ccc gca gcc ctt gcc gcc cag ggc cag ctg ccc agc tgc att gcc    3027
Lys Pro Ala Ala Leu Ala Ala Gln Gly Gln Leu Pro Ser Cys Ile Ala
                995             1000            1005

acc ccc tac tcc ccg cca ccc cca gag acg gag aag gtg cct ccc acc    3075
Thr Pro Tyr Ser Pro Pro Pro Pro Glu Thr Glu Lys Val Pro Pro Thr
                1010            1015            1020

cgc aag gaa aca cgg ttt gag gaa ggc gag caa cca ggc cag ggc acc    3123
Arg Lys Glu Thr Arg Phe Glu Glu Gly Glu Gln Pro Gly Gln Gly Thr
        1025            1030            1035

ccc ggg gat cca gag ccc gtg tgt gtg ccc atc gct gtg gcc gag tca    3171
Pro Gly Asp Pro Glu Pro Val Cys Val Pro Ile Ala Val Ala Glu Ser
    1040            1045            1050

gac aca gat gac caa gaa gaa gat gag gag aac agc ctg ggc acg gag    3219
Asp Thr Asp Asp Gln Glu Glu Asp Glu Glu Asn Ser Leu Gly Thr Glu
1055            1060            1065            1070

gag gag tcc agc aag cag gaa tcc cag cct gtg tcc ggt ggc cca gag    3267
Glu Glu Ser Ser Lys Gln Glu Ser Gln Pro Val Ser Gly Gly Pro Glu
            1075            1080            1085
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-5-

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gcc cct ccg gat tcc agg acc tgg agc cag gtg tca gcg act gcc tcc        3315
Ala Pro Pro Asp Ser Arg Thr Trp Ser Gln Val Ser Ala Thr Ala Ser
        1090            1095            1100

tct gag gcc gag gcc agt gca tct cag gcc gac tgg cgg cag cag tgg        3363
Ser Glu Ala Glu Ala Ser Ala Ser Gln Ala Asp Trp Arg Gln Gln Trp
        1105            1110            1115

aaa gcg gaa ccc cag gcc cca ggg tgc ggt gag acc cca gag gac agt        3411
Lys Ala Glu Pro Gln Ala Pro Gly Cys Gly Glu Thr Pro Glu Asp Ser
        1120            1125            1130

tgc tcc gag ggc agc aca gca gac atg acc aac acc gct gag ctc ctg        3459
Cys Ser Glu Gly Ser Thr Ala Asp Met Thr Asn Thr Ala Glu Leu Leu
1135            1140            1145            1150

gag cag atc cct gac ctc ggc cag gat gtc aag gac cca gag gac tgc        3507
Glu Gln Ile Pro Asp Leu Gly Gln Asp Val Lys Asp Pro Glu Asp Cys
            1155            1160            1165

ttc act gaa ggc tgt gtc cgg cgc tgt ccc tgc tgt gcg gtg gac acc        3555
Phe Thr Glu Gly Cys Val Arg Arg Cys Pro Cys Cys Ala Val Asp Thr
            1170            1175            1180

aca cag gcc cca ggg aag gtc tgg tgg cgg ttg cgc aag acc tgc tac        3603
Thr Gln Ala Pro Gly Lys Val Trp Trp Arg Leu Arg Lys Thr Cys Tyr
            1185            1190            1195

cac atc gtg gag cac agc tgg ttc gag aca ttc atc atc ttc atg atc        3651
His Ile Val Glu His Ser Trp Phe Glu Thr Phe Ile Ile Phe Met Ile
        1200            1205            1210

cta ctc agc agt gga gcg ctg gcc ttc gag gac atc tac cta gag gag        3699
Leu Leu Ser Ser Gly Ala Leu Ala Phe Glu Asp Ile Tyr Leu Glu Glu
1215            1220            1225            1230

cgg aag acc atc aag gtt ctg ctt gag tat gcc gac aag atg ttc aca        3747
Arg Lys Thr Ile Lys Val Leu Leu Glu Tyr Ala Asp Lys Met Phe Thr
            1235            1240            1245

tat gtc ttc gtg ctg gag atg ctg ctc aag tgg gtg gcc tac ggc ttc        3795
Tyr Val Phe Val Leu Glu Met Leu Leu Lys Trp Val Ala Tyr Gly Phe
            1250            1255            1260

aag aag tac ttc acc aat gcc tgg tgc tgg ctc gac ttc ctc atc gta        3843
Lys Lys Tyr Phe Thr Asn Ala Trp Cys Trp Leu Asp Phe Leu Ile Val
            1265            1270            1275

gac gtc tct ctg gtc agc ctg gtg gcc aac acc ctg ggc ttt gcc gag        3891
Asp Val Ser Leu Val Ser Leu Val Ala Asn Thr Leu Gly Phe Ala Glu
        1280            1285            1290

atg ggc ccc atc aag tca ctg cgg acg ctg cgt gca ctc cgt cct ctg        3939
Met Gly Pro Ile Lys Ser Leu Arg Thr Leu Arg Ala Leu Arg Pro Leu
1295            1300            1305            1310

aga gct ctg tca cga ttt gag ggc atg agg gtg gtg gtc aat gcc ctg        3987
Arg Ala Leu Ser Arg Phe Glu Gly Met Arg Val Val Val Asn Ala Leu
            1315            1320            1325
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-6-

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gtg ggc gcc atc ccg tcc atc atg aac gtc ctc ctc gtc tgc ctc atc   4035
Val Gly Ala Ile Pro Ser Ile Met Asn Val Leu Leu Val Cys Leu Ile
          1330              1335              1340

ttc tgg ctc atc ttc agc atc atg ggc gtg aac ctc ttt gcg ggg aag   4083
Phe Trp Leu Ile Phe Ser Ile Met Gly Val Asn Leu Phe Ala Gly Lys
          1345              1350              1355

ttt ggg agg tgc atc aac cag aca gag gga gac ttg cct ttg aac tac   4131
Phe Gly Arg Cys Ile Asn Gln Thr Glu Gly Asp Leu Pro Leu Asn Tyr
          1360              1365              1370

acc atc gtg aac aac aag agc cag tgt gag tcc ttg aac ttg acc gga   4179
Thr Ile Val Asn Asn Lys Ser Gln Cys Glu Ser Leu Asn Leu Thr Gly
1375              1380              1385              1390

gaa ttg tac tgg acc aag gtg aaa gtc aac ttt gac aac gtg ggg gcc   4227
Glu Leu Tyr Trp Thr Lys Val Lys Val Asn Phe Asp Asn Val Gly Ala
              1395              1400              1405

ggg tac ctg gcc ctt ctg cag gtg gca aca ttt aaa ggc tgg atg gac   4275
Gly Tyr Leu Ala Leu Leu Gln Val Ala Thr Phe Lys Gly Trp Met Asp
              1410              1415              1420

att atg tat gca gct gtg gac tcc agg ggg tat gaa gag cag cct cag   4323
Ile Met Tyr Ala Ala Val Asp Ser Arg Gly Tyr Glu Glu Gln Pro Gln
          1425              1430              1435

tgg gaa tac aac ctc tac atg tac atc tat ttt gtc att ttc atc atc   4371
Trp Glu Tyr Asn Leu Tyr Met Tyr Ile Tyr Phe Val Ile Phe Ile Ile
          1440              1445              1450

ttt ggg tct ttc ttc acc ctg aac ctc ttt att ggt gtc atc att gac   4419
Phe Gly Ser Phe Phe Thr Leu Asn Leu Phe Ile Gly Val Ile Ile Asp
1455              1460              1465              1470

aac ttc aac caa cag aag aaa aag tta ggg ggc cag gac atc ttc atg   4467
Asn Phe Asn Gln Gln Lys Lys Lys Leu Gly Gly Gln Asp Ile Phe Met
              1475              1480              1485

aca gag gag cag aag aag tac tac aat gcc atg aag aag ctg ggc tcc   4515
Thr Glu Glu Gln Lys Lys Tyr Tyr Asn Ala Met Lys Lys Leu Gly Ser
          1490              1495              1500

aag aag ccc cag aag ccc atc cca cgg ccc ctg aac aag tac cag ggc   4563
Lys Lys Pro Gln Lys Pro Ile Pro Arg Pro Leu Asn Lys Tyr Gln Gly
          1505              1510              1515

ttc ata ttc gac att gtg acc aag cag gcc ttt gac gtc acc atc atg   4611
Phe Ile Phe Asp Ile Val Thr Lys Gln Ala Phe Asp Val Thr Ile Met
          1520              1525              1530

ttt ctg atc tgc ttg aat atg gtg acc atg atg gtg gag aca gat gac   4659
Phe Leu Ile Cys Leu Asn Met Val Thr Met Met Val Glu Thr Asp Asp
1535              1540              1545              1550

caa agt cct gag aaa atc aac atc ttg gcc aag atc aac ctg ctc ttt   4707
Gln Ser Pro Glu Lys Ile Asn Ile Leu Ala Lys Ile Asn Leu Leu Phe
              1555              1560              1565
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gtg gcc atc ttc aca ggc gag tgt att gtc aag ctg gct gcc ctg cgc        4755
Val Ala Ile Phe Thr Gly Glu Cys Ile Val Lys Leu Ala Ala Leu Arg
            1570                1575                1580

cac tac tac ttc acc aac agc tgg aat atc ttc gac ttc gtg gtt gtc        4803
His Tyr Tyr Phe Thr Asn Ser Trp Asn Ile Phe Asp Phe Val Val Val
            1585                1590                1595

atc ctc tcc atc gtg ggc act gtg ctc tcg gac atc atc cag aag tac        4851
Ile Leu Ser Ile Val Gly Thr Val Leu Ser Asp Ile Ile Gln Lys Tyr
         1600                1605                1610

ttc ttc tcc ccg acg ctc ttc cga gtc atc cgc ctg gcc cga ata ggc        4899
Phe Phe Ser Pro Thr Leu Phe Arg Val Ile Arg Leu Ala Arg Ile Gly
1615                1620                1625                1630

cgc atc ctc aga ctg atc cga ggg gcc aag ggg atc cgc acg ctg ctc        4947
Arg Ile Leu Arg Leu Ile Arg Gly Ala Lys Gly Ile Arg Thr Leu Leu
            1635                1640                1645

ttt gcc ctc atg atg tcc ctg cct gcc ctc ttc aac atc ggg ctg ctg        4995
Phe Ala Leu Met Met Ser Leu Pro Ala Leu Phe Asn Ile Gly Leu Leu
            1650                1655                1660

ctc ttc ctc gtc atg ttc atc tac tcc atc ttt ggc atg gcc aac ttc        5043
Leu Phe Leu Val Met Phe Ile Tyr Ser Ile Phe Gly Met Ala Asn Phe
            1665                1670                1675

gct tat gtc aag tgg gag gct ggc atc gac gac atg ttc aac ttc cag        5091
Ala Tyr Val Lys Trp Glu Ala Gly Ile Asp Asp Met Phe Asn Phe Gln
         1680                1685                1690

acc ttc gcc aac agc atg ctg tgc ctc ttc cag atc acc acg tcg gcc        5139
Thr Phe Ala Asn Ser Met Leu Cys Leu Phe Gln Ile Thr Thr Ser Ala
1695                1700                1705                1710

ggc tgg gat ggc ctc ctc agc ccc atc ctc aac act ggg ccg ccc tac        5187
Gly Trp Asp Gly Leu Leu Ser Pro Ile Leu Asn Thr Gly Pro Pro Tyr
            1715                1720                1725

tgc gac ccc act ctg ccc aac agc aat ggc tct cgg ggg gac tgc ggg        5235
Cys Asp Pro Thr Leu Pro Asn Ser Asn Gly Ser Arg Gly Asp Cys Gly
            1730                1735                1740

agc cca gcc gtg ggc atc ctc ttc ttc acc acc tac atc atc atc tcc        5283
Ser Pro Ala Val Gly Ile Leu Phe Phe Thr Thr Tyr Ile Ile Ile Ser
            1745                1750                1755

ttc ctc atc gtg gtc aac atg tac att gcc atc atc ctg gag aac ttc        5331
Phe Leu Ile Val Val Asn Met Tyr Ile Ala Ile Ile Leu Glu Asn Phe
            1760                1765                1770

agc gtg gcc acg gag gag agc acc gag ccc ctg agt gag gac gac ttc        5379
Ser Val Ala Thr Glu Glu Ser Thr Glu Pro Leu Ser Glu Asp Asp Phe
1775                1780                1785                1790

gat atg ttc tat gag atc tgg gag aaa ttt gac cca gag gcc act cag        5427
Asp Met Phe Tyr Glu Ile Trp Glu Lys Phe Asp Pro Glu Ala Thr Gln
            1795                1800                1805
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-8-

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ttt att gag tat tcg gtc ctg tct gac ttt gcc gat gcc ctg tct gag     5475
Phe Ile Glu Tyr Ser Val Leu Ser Asp Phe Ala Asp Ala Leu Ser Glu
        1810                1815                1820

cca ctc cgt atc gcc aag ccc aac cag ata agc ctc atc aac atg gac     5523
Pro Leu Arg Ile Ala Lys Pro Asn Gln Ile Ser Leu Ile Asn Met Asp
        1825                1830                1835

ctg ccc atg gtg agt ggg gac cgc atc cat tgc atg gac att ctc ttt     5571
Leu Pro Met Val Ser Gly Asp Arg Ile His Cys Met Asp Ile Leu Phe
    1840                1845                1850

gcc ttc acc aaa agg gtc ctg ggg gag tct ggg gag atg gac gcc ctg     5619
Ala Phe Thr Lys Arg Val Leu Gly Glu Ser Gly Glu Met Asp Ala Leu
1855                1860                1865                1870

aag atc cag atg gag gag aag ttc atg gca gcc aac cca tcc aag atc     5667
Lys Ile Gln Met Glu Glu Lys Phe Met Ala Ala Asn Pro Ser Lys Ile
            1875                1880                1885

tcc tac gag ccc atc acc acc aca ctc cgg cgc aag cac gaa gag gtg     5715
Ser Tyr Glu Pro Ile Thr Thr Thr Leu Arg Arg Lys His Glu Glu Val
        1890                1895                1900

tcg gcc atg gtt atc cag aga gcc ttc cgc agg cac ctg ctg caa cgc     5763
Ser Ala Met Val Ile Gln Arg Ala Phe Arg Arg His Leu Leu Gln Arg
        1905                1910                1915

tct ttg aag cat gcc tcc ttc ctc ttc cgt cag cag gcg ggc agc ggc     5811
Ser Leu Lys His Ala Ser Phe Leu Phe Arg Gln Gln Ala Gly Ser Gly
        1920                1925                1930

ctc tcc gaa gag gat gcc cct gag cga gag ggc ctc atc gcc tac gtg     5859
Leu Ser Glu Glu Asp Ala Pro Glu Arg Glu Gly Leu Ile Ala Tyr Val
1935                1940                1945                1950

atg agt gag aac ttc tcc cga ccc ctt ggc cca ccc tcc agc tcc tcc     5907
Met Ser Glu Asn Phe Ser Arg Pro Leu Gly Pro Pro Ser Ser Ser Ser
            1955                1960                1965

atc tcc tcc act tcc ttc cca ccc tcc tat gac agt gtc act aga gcc     5955
Ile Ser Ser Thr Ser Phe Pro Pro Ser Tyr Asp Ser Val Thr Arg Ala
        1970                1975                1980

acc agc gat aac ctc cag gtg cgg ggg tct gac tac agc cac agt gaa     6003
Thr Ser Asp Asn Leu Gln Val Arg Gly Ser Asp Tyr Ser His Ser Glu
        1985                1990                1995

gat ctc gcc gac ttc ccc cct tct ccg gac agg gac cgt gag tcc atc     6051
Asp Leu Ala Asp Phe Pro Pro Ser Pro Asp Arg Asp Arg Glu Ser Ile
    2000                2005                2010

gtg tgagcctcgg cctggctggc caggacacac tgaaaag                        6091
Val
2015

<210> 2
<211> 2015
<212> PRT
<213> Homo sapiens
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-9-

<400> 2

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Met Ala Asn Phe Leu Leu Pro Arg Gly Thr Ser Ser Phe Arg Arg Phe
 1               5                  10                  15

Thr Arg Glu Ser Leu Ala Ala Ile Glu Lys Arg Met Ala Glu Lys Gln
            20                  25                  30

Ala Arg Gly Ser Thr Thr Leu Gln Glu Ser Arg Glu Gly Leu Pro Glu
            35                  40                  45

Glu Glu Ala Pro Arg Pro Gln Leu Asp Leu Gln Ala Ser Lys Lys Leu
    50                  55                  60

Pro Asp Leu Tyr Gly Asn Pro Pro Gln Glu Leu Ile Gly Glu Pro Leu
65                  70                  75                  80

Glu Asp Leu Asp Pro Phe Tyr Ser Thr Gln Lys Thr Phe Ile Val Leu
                85                  90                  95

Asn Lys Gly Lys Thr Ile Phe Arg Phe Ser Ala Thr Asn Ala Leu Tyr
            100                 105                 110

Val Leu Ser Pro Phe His Pro Ile Arg Arg Ala Ala Val Lys Ile Leu
            115                 120                 125

Val His Ser Leu Phe Asn Met Leu Ile Met Cys Thr Ile Leu Thr Asn
    130                 135                 140

Cys Val Phe Met Ala Gln His Asp Pro Pro Pro Trp Thr Lys Tyr Val
145                 150                 155                 160

Glu Tyr Thr Phe Thr Ala Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile
                165                 170                 175

Leu Ala Arg Gly Phe Cys Leu His Ala Phe Thr Phe Leu Arg Asp Pro
            180                 185                 190

Trp Asn Trp Leu Asp Phe Ser Val Ile Ile Met Ala Tyr Thr Thr Glu
            195                 200                 205

Phe Val Asp Leu Gly Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu
    210                 215                 220

Arg Ala Leu Lys Thr Ile Ser Val Ile Ser Gly Leu Lys Thr Ile Val
225                 230                 235                 240

Gly Ala Leu Ile Gln Ser Val Lys Lys Leu Ala Asp Val Met Val Leu
            245                 250                 255

Thr Val Phe Cys Leu Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe
            260                 265                 270

Met Gly Asn Leu Arg His Lys Cys Val Arg Asn Phe Thr Ala Leu Asn
            275                 280                 285

Gly Thr Asn Gly Ser Val Glu Ala Asp Gly Leu Val Trp Glu Ser Leu
    290                 295                 300
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-10-

Asp Leu Tyr Leu Ser Asp Pro Glu Asn Tyr Leu Leu Lys Asn Gly Thr
305   310   315   320

Ser Asp Val Leu Leu Cys Gly Asn Ser Ser Asp Ala Gly Thr Cys Pro
                325   330   335

Glu Gly Tyr Arg Cys Leu Lys Ala Gly Glu Asn Pro Asp His Gly Tyr
            340   345   350

Thr Ser Phe Asp Ser Phe Ala Trp Ala Phe Leu Ala Leu Phe Arg Leu
        355   360   365

Met Thr Gln Asp Cys Trp Glu Arg Leu Tyr Gln Gln Thr Leu Arg Ser
    370   375   380

Ala Gly Lys Ile Tyr Met Ile Phe Phe Met Leu Val Ile Phe Leu Gly
385   390   395   400

Ser Phe Tyr Leu Val Asn Leu Ile Leu Ala Val Val Ala Met Ala Tyr
            405   410   415

Glu Glu Gln Asn Gln Ala Thr Ile Ala Glu Thr Glu Glu Lys Glu Lys
        420   425   430

Arg Phe Gln Glu Ala Met Glu Met Leu Lys Lys Glu His Glu Ala Leu
        435   440   445

Thr Ile Arg Gly Val Asp Thr Val Ser Arg Ser Ser Leu Glu Met Ser
    450   455   460

Pro Leu Ala Pro Val Asn Ser His Glu Arg Arg Ser Lys Arg Arg Lys
465   470   475   480

Arg Met Ser Ser Gly Thr Glu Glu Cys Gly Glu Asp Arg Leu Pro Lys
            485   490   495

Ser Asp Ser Glu Asp Gly Pro Arg Ala Met Asn His Leu Ser Leu Thr
            500   505   510

Arg Gly Leu Ser Arg Thr Ser Met Lys Pro Arg Ser Ser Arg Gly Ser
            515   520   525

Ile Phe Thr Phe Arg Arg Arg Asp Leu Gly Ser Glu Ala Asp Phe Ala
    530   535   540

Asp Asp Glu Asn Ser Thr Ala Gly Glu Ser Glu Ser His Arg Thr Ser
545   550   555   560

Leu Leu Val Pro Trp Pro Leu Arg Arg Thr Ser Ala Gln Gly Gln Pro
            565   570   575

Ser Pro Gly Thr Ser Ala Pro Gly His Ala Leu His Gly Lys Lys Asn
            580   585   590

Ser Thr Val Asp Cys Asn Gly Val Val Ser Leu Leu Gly Ala Gly Asp
            595   600   605

Pro Glu Ala Thr Ser Pro Gly Ser His Ile Leu Arg Pro Val Met Leu
    610   615   620

```
Glu His Pro Pro Asp Thr Thr Thr Pro Ser Glu Glu Pro Gly Gly Pro
625             630         635             640

Gln Met Leu Thr Ser Gln Ala Pro Cys Val Asp Gly Phe Glu Glu Pro
            645         650             655

Gly Ala Arg Gln Arg Ala Leu Ser Ala Val Ser Val Leu Thr Ser Ala
            660         665             670

Leu Glu Glu Leu Glu Glu Ser Arg His Lys Cys Pro Pro Cys Trp Asn
            675         680             685

Arg Leu Ala Gln Arg Tyr Leu Ile Trp Glu Cys Cys Pro Leu Trp Met
    690         695             700

Ser Ile Lys Gln Gly Val Lys Leu Val Val Met Asp Pro Phe Thr Asp
705             710         715             720

Leu Thr Ile Thr Met Cys Ile Val Leu Asn Thr Leu Phe Met Ala Leu
            725         730             735

Glu His Tyr Asn Met Thr Ser Glu Phe Glu Glu Met Leu Gln Val Gly
        740         745             750

Asn Leu Val Phe Thr Gly Ile Phe Thr Ala Glu Met Thr Phe Lys Ile
        755         760             765

Ile Ala Leu Asp Pro Tyr Tyr Tyr Phe Gln Gln Gly Trp Asn Ile Phe
    770         775             780

Asp Ser Ile Ile Val Ile Leu Ser Leu Met Glu Leu Gly Leu Ser Arg
785             790         795             800

Met Ser Asn Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            805         810             815

Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Thr Leu Ile Lys Ile Ile
        820         825             830

Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu Ala Ile
        835         840             845

Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly Lys Asn
    850         855             860

Tyr Ser Glu Leu Arg Asp Ser Asp Ser Gly Leu Leu Pro Arg Trp His
865             870         875             880

Met Met Asp Phe Phe His Ala Phe Leu Ile Ile Phe Arg Ile Leu Cys
            885         890             895

Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ser Gly Gln
            900         905             910

Ser Leu Cys Leu Leu Val Phe Leu Leu Val Met Val Ile Gly Asn Leu
    915         920             925

Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe Ser Ala
    930         935             940
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-12-

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Asp Asn Leu Thr Ala Pro Asp Glu Asp Arg Glu Met Asn Asn Leu Gln
945                 950                 955                     960

Leu Ala Leu Ala Arg Ile Gln Arg Gly Leu Arg Phe Val Lys Arg Thr
                965                 970                 975

Thr Trp Asp Phe Cys Cys Gly Leu Leu Arg Gln Arg Pro Gln Lys Pro
            980                 985                 990

Ala Ala Leu Ala Ala Gln Gly Gln Leu Pro Ser Cys Ile Ala Thr Pro
        995                 1000                1005

Tyr Ser Pro Pro Pro Pro Glu Thr Glu Lys Val Pro Pro Thr Arg Lys
    1010                1015                1020

Glu Thr Arg Phe Glu Glu Gly Glu Gln Pro Gly Gln Gly Thr Pro Gly
1025                1030                1035                1040

Asp Pro Glu Pro Val Cys Val Pro Ile Ala Val Ala Glu Ser Asp Thr
            1045                1050                1055

Asp Asp Gln Glu Glu Asp Glu Glu Asn Ser Leu Gly Thr Glu Glu Glu
        1060                1065                1070

Ser Ser Lys Gln Glu Ser Gln Pro Val Ser Gly Gly Pro Glu Ala Pro
        1075                1080                1085

Pro Asp Ser Arg Thr Trp Ser Gln Val Ser Ala Thr Ala Ser Ser Glu
    1090                1095                1100

Ala Glu Ala Ser Ala Ser Gln Ala Asp Trp Arg Gln Gln Trp Lys Ala
1105                1110                1115                1120

Glu Pro Gln Ala Pro Gly Cys Gly Glu Thr Pro Glu Asp Ser Cys Ser
            1125                1130                1135

Glu Gly Ser Thr Ala Asp Met Thr Asn Thr Ala Glu Leu Leu Glu Gln
        1140                1145                1150

Ile Pro Asp Leu Gly Gln Asp Val Lys Asp Pro Glu Asp Cys Phe Thr
    1155                1160                1165

Glu Gly Cys Val Arg Arg Cys Pro Cys Cys Ala Val Asp Thr Thr Gln
    1170                1175                1180

Ala Pro Gly Lys Val Trp Trp Arg Leu Arg Lys Thr Cys Tyr His Ile
1185                1190                1195                1200

Val Glu His Ser Trp Phe Glu Thr Phe Ile Ile Phe Met Ile Leu Leu
            1205                1210                1215

Ser Ser Gly Ala Leu Ala Phe Glu Asp Ile Tyr Leu Glu Glu Arg Lys
        1220                1225                1230

Thr Ile Lys Val Leu Leu Glu Tyr Ala Asp Lys Met Phe Thr Tyr Val
        1235                1240                1245

Phe Val Leu Glu Met Leu Leu Lys Trp Val Ala Tyr Gly Phe Lys Lys
    1250                1255                1260
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-13-

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Tyr Phe Thr Asn Ala Trp Cys Trp Leu Asp Phe Leu Ile Val Asp Val
1265               1270               1275               1280

Ser Leu Val Ser Leu Val Ala Asn Thr Leu Gly Phe Ala Glu Met Gly
              1285               1290               1295

Pro Ile Lys Ser Leu Arg Thr Leu Arg Ala Leu Arg Pro Leu Arg Ala
          1300               1305               1310

Leu Ser Arg Phe Glu Gly Met Arg Val Val Val Asn Ala Leu Val Gly
          1315               1320               1325

Ala Ile Pro Ser Ile Met Asn Val Leu Leu Val Cys Leu Ile Phe Trp
      1330               1335               1340

Leu Ile Phe Ser Ile Met Gly Val Asn Leu Phe Ala Gly Lys Phe Gly
1345               1350               1355               1360

Arg Cys Ile Asn Gln Thr Glu Gly Asp Leu Pro Leu Asn Tyr Thr Ile
              1365               1370               1375

Val Asn Asn Lys Ser Gln Cys Glu Ser Leu Asn Leu Thr Gly Glu Leu
          1380               1385               1390

Tyr Trp Thr Lys Val Lys Val Asn Phe Asp Asn Val Gly Ala Gly Tyr
      1395               1400               1405

Leu Ala Leu Leu Gln Val Ala Thr Phe Lys Gly Trp Met Asp Ile Met
   1410               1415               1420

Tyr Ala Ala Val Asp Ser Arg Gly Tyr Glu Glu Gln Pro Gln Trp Glu
1425               1430               1435               1440

Tyr Asn Leu Tyr Met Tyr Ile Tyr Phe Val Ile Phe Ile Ile Phe Gly
          1445               1450               1455

Ser Phe Phe Thr Leu Asn Leu Phe Ile Gly Val Ile Ile Asp Asn Phe
          1460               1465               1470

Asn Gln Gln Lys Lys Lys Leu Gly Gly Gln Asp Ile Phe Met Thr Glu
          1475               1480               1485

Glu Gln Lys Lys Tyr Tyr Asn Ala Met Lys Lys Leu Gly Ser Lys Lys
   1490               1495               1500

Pro Gln Lys Pro Ile Pro Arg Pro Leu Asn Lys Tyr Gln Gly Phe Ile
1505               1510               1515               1520

Phe Asp Ile Val Thr Lys Gln Ala Phe Asp Val Thr Ile Met Phe Leu
          1525               1530               1535

Ile Cys Leu Asn Met Val Thr Met Met Val Glu Thr Asp Asp Gln Ser
          1540               1545               1550

Pro Glu Lys Ile Asn Ile Leu Ala Lys Ile Asn Leu Leu Phe Val Ala
      1555               1560               1565

Ile Phe Thr Gly Glu Cys Ile Val Lys Leu Ala Ala Leu Arg His Tyr
   1570               1575               1580
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Tyr Phe Thr Asn Ser Trp Asn Ile Phe Asp Phe Val Val Val Ile Leu
1585            1590            1595            1600

Ser Ile Val Gly Thr Val Leu Ser Asp Ile Ile Gln Lys Tyr Phe Phe
                1605            1610            1615

Ser Pro Thr Leu Phe Arg Val Ile Arg Leu Ala Arg Ile Gly Arg Ile
            1620            1625            1630

Leu Arg Leu Ile Arg Gly Ala Lys Gly Ile Arg Thr Leu Leu Phe Ala
        1635            1640            1645

Leu Met Met Ser Leu Pro Ala Leu Phe Asn Ile Gly Leu Leu Leu Phe
    1650            1655            1660

Leu Val Met Phe Ile Tyr Ser Ile Phe Gly Met Ala Asn Phe Ala Tyr
1665            1670            1675            1680

Val Lys Trp Glu Ala Gly Ile Asp Asp Met Phe Asn Phe Gln Thr Phe
                1685            1690            1695

Ala Asn Ser Met Leu Cys Leu Phe Gln Ile Thr Thr Ser Ala Gly Trp
            1700            1705            1710

Asp Gly Leu Leu Ser Pro Ile Leu Asn Thr Gly Pro Pro Tyr Cys Asp
        1715            1720            1725

Pro Thr Leu Pro Asn Ser Asn Gly Ser Arg Gly Asp Cys Gly Ser Pro
    1730            1735            1740

Ala Val Gly Ile Leu Phe Phe Thr Thr Tyr Ile Ile Ile Ser Phe Leu
1745            1750            1755            1760

Ile Val Val Asn Met Tyr Ile Ala Ile Ile Leu Glu Asn Phe Ser Val
            1765            1770            1775

Ala Thr Glu Glu Ser Thr Glu Pro Leu Ser Glu Asp Asp Phe Asp Met
        1780            1785            1790

Phe Tyr Glu Ile Trp Glu Lys Phe Asp Pro Glu Ala Thr Gln Phe Ile
    1795            1800            1805

Glu Tyr Ser Val Leu Ser Asp Phe Ala Asp Ala Leu Ser Glu Pro Leu
    1810            1815            1820

Arg Ile Ala Lys Pro Asn Gln Ile Ser Leu Ile Asn Met Asp Leu Pro
1825            1830            1835            1840

Met Val Ser Gly Asp Arg Ile His Cys Met Asp Ile Leu Phe Ala Phe
            1845            1850            1855

Thr Lys Arg Val Leu Gly Glu Ser Gly Glu Met Asp Ala Leu Lys Ile
        1860            1865            1870

Gln Met Glu Glu Lys Phe Met Ala Ala Asn Pro Ser Lys Ile Ser Tyr
    1875            1880            1885

Glu Pro Ile Thr Thr Thr Leu Arg Arg Lys His Glu Glu Val Ser Ala
    1890            1895            1900
```

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Met Val Ile Gln Arg Ala Phe Arg Arg His Leu Leu Gln Arg Ser Leu
1905              1910              1915              1920

Lys His Ala Ser Phe Leu Phe Arg Gln Gln Ala Gly Ser Gly Leu Ser
                1925              1930              1935

Glu Glu Asp Ala Pro Glu Arg Glu Gly Leu Ile Ala Tyr Val Met Ser
                1940              1945              1950

Glu Asn Phe Ser Arg Pro Leu Gly Pro Pro Ser Ser Ser Ser Ile Ser
            1955              1960              1965

Ser Thr Ser Phe Pro Pro Ser Tyr Asp Ser Val Thr Arg Ala Thr Ser
    1970              1975              1980

Asp Asn Leu Gln Val Arg Gly Ser Asp Tyr Ser His Ser Glu Asp Leu
1985              1990              1995              2000

Ala Asp Phe Pro Pro Ser Pro Asp Arg Asp Arg Glu Ser Ile Val
                2005              2010              2015


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<220>
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<400> 3
gatgagaaga tggcaaactt cc                                      22


<210> 4
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
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gctctggatc cccggggggtg cc                                     22


<210> 5
<211> 20
<212> DNA
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<220>
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cacccccggg gatccagagc                                         20
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ttcagtgtgt cctggccag                                                    19


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ttcctcatcg tggttaacct gtacattgcc atc                                    33


<210> 8
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ggagatgatg atgtaggtgg                                                   20


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cgagagccac cgcgcatcac tgctg                                             25


<210> 10
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<220>
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ctctcccccg ctgtgctgtt ttc                                               23
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